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Citation for published version:

De Simone, GF & Russell, B 2019, 'The late-antique eruption of Vesuvius in A.D. 472 and its impact from the Bay of Naples to Aeclanum', *Journal of Roman Archaeology*, vol. 32, pp. 359-388.
<https://doi.org/10.1017/S1047759419000187>

Digital Object Identifier (DOI):

[10.1017/S1047759419000187](https://doi.org/10.1017/S1047759419000187)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

Journal of Roman Archaeology

Publisher Rights Statement:

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The *Other* Eruption of Vesuvius: Snapshots of Campania and the Apennines in AD 472

Girolamo Ferdinando De Simone & Ben Russell

The ‘Pompeian eruption’ of AD 79 has long dominated archaeological discourse on Vesuvius. Other eruptions, both earlier and later, have received less attention but are no less useful archaeologically.¹ These eruptions deposited distinctive volcanic materials often easily identifiable in the stratigraphic record, so providing dated *termini ante quos*, which can in turn offer a snapshot of life around the volcano in different periods. The ‘Pompeian eruption’ provides just such a horizon for 1st c. AD Campania, while the earlier ‘Avellino pumices eruption’ does the same for the Bronze Age.² By tracking the volcanic deposits that can be tied to these events, the situation on the ground prior to such eruptions can be examined, as can the ways in which communities and landscapes reacted to, and recovered from, them.

Fascination with the destructive power of these eruptions has tended to lead to ‘disaster narratives’,³ which often overshadow accurate assessment of the damage wrought and the less negative outcomes brought about, such as economic stimulus and structural change.⁴ Wider research in Campania, indeed, has now demonstrated the degree to which at least some of the region bounced back after AD 79.⁵ Not every city suffered the same fate as Pompeii. Neapolis and Nola survived and continued to prosper; in their territories, on the northern flanks of the volcano, new and larger villas sprouted up in the aftermath of the eruption.⁶ Further inland, the ‘Pompeian eruption’ had little impact. Minor eruptions in AD 172, 203, 222 and 303, events that volcanologists have only recently been able to identify, seem not to have caused widespread disruption. But the same was not true of a massive 5th c. eruption of Vesuvius, conventionally dated to 6 November AD 472. The effects of this ‘Pollena eruption’ were felt, so the sixth-century chronicler Marcellinus Comes tells us, across Europe and as far away as Constantinople, the ash ‘causing night during the day.’⁷

While less explosive than its more famous predecessor, ash from this ‘Pollena eruption’ covered much of inland Campania and areas of northern Apulia (Fig. 1).⁸ Excavation data provide key information of the spread of tephra from this eruption, allowing volcanologists to model it, but can also be used to understand the discrepant experiences of 5th c. communities who had already been struck by the 4th c. earthquake and, in some cases, the Visigothic and Vandal incursions. This paper draws on published and new data from the slopes of the Somma-Vesuvius volcanic complex, the Sarno and Nola plains, the western flank of the Apennines, and Hirpinia, up to 55 km from the volcano, which provide a new perspective on this key event in the final years of the western Roman Empire.

¹ For a three-volume collection of written sources on Vesuvian eruptions, see Ricciardi 2009.

² Albore Livadie 2002; Albore Livadie 2011; Sevink *et al.* 2011.

³ Roberts 2013.

⁴ Grattan 2006; Grattan and Torrence 2007.

⁵ Soricelli 1997; *id.* 2001; Tuck (in press).

⁶ De Simone 2014.

⁷ Marcell. Comes, *Chron.* M.G.H., A.A. XI, 90.

⁸ Almost all sites discussed in this paper are now in the modern *regione* of Campania but in late antiquity they were divided between Campania and Apulia et Calabria. Current scholarship (Clemente 1965; Grelle and Volpe 1994; Volpe 1996, 25-37; Savino 2005, 18-26) mostly agrees in considering Aeclanum as part of the province of Apulia et Calabria since its creation (contra Thomsen 1947 and Sirago 1996 who argue it originally belonged to Campania); Beneventum shifted a couple of times between Campania and Apulia et Calabria, whereas from AD 333 onwards remained solidly in Campania (Torelli 2002, 246).

Setting the scene: Campania in the 4th and 5th c. AD (GFDS)

Between the ‘Pompeian’ and ‘Pollena’ eruptions, Campania changed significantly, most notably in the 4th to 5th c.. The beginning of this period is defined by administrative attempts to boost investment across the Italian peninsula. Reforms begun by Diocletian (AD 293-8) and completed by Constantine (AD 313, with later adjustments) aimed to encourage local elites to spend on both agricultural production and acts of euergetism.⁹ Constantine himself set a good example, by sponsoring building and restoration work, notably of the Aqua Augusta (the Serino aqueduct), the longest aqueduct in Italy, which had been severely affected by the 62/63 earthquake and the subsidence of the ground level (negative bradyseism) caused by the emptying of the magmatic chamber beneath Vesuvius after the AD 79 eruption.¹⁰ This stimulus seems to have worked. Capua, the capital of the new province and residence of its governors, shows signs of vitality.¹¹ The importance of the grain from the Ager Campanus let it satisfy the *annona* for Rome and provide extra provisions, when required, for the coastal cities.¹² Ausonius considers it as the third city of Italy in the 4th c..¹³ Signs of economic liveliness are also noticeable in Puteoli in the 4th c.. The luxurious villas on the coast, ruined and abandoned during the 3rd c., started being restored and tourists came back, as both the Puteoli flasks and developments in the *Clivi Vittrari sive Vici Turari* neighbourhood show.¹⁴ The economy of the city never again reached the levels of the 1st-2nd c., however: new shops were opened at the forum (albeit using spoliated materials) and inscriptions testify to works on the shoreline up until the end of the 4th c., however other shops were abandoned and used for burials; from the middle of the century the *macellum* started sinking due to negative bradyseism.¹⁵ Neapolis presents a comparable picture. In the 4th c. it was a city still culturally characterised by *tranquillitas* and *deliciae*.¹⁶ The archaeological evidence shows a certain economic stability, though population decline and the abandonment of the suburban areas point to certain strains. Throughout the 4th c., large houses started being broken up into smaller domestic units and open areas converted into rubbish dumps or orchards.¹⁷ These developments are more marked in the smaller cities of the Ager Campanus, notably the satellite cities of Calatia and Suessula. These had begun to experience gradual de-urbanisation as early as the 4th c.. At Calatia, after the collapse of a roof, a house is abandoned and a lime kiln is set in another building; the road surfaces are also spoliated.¹⁸ At Suessula, between the 3rd and the 4th c. some peripheral buildings are abandoned and transformed into orchards. Changes occur also at the forum and the basilica, with walls built between columns; by the end of the 4th c. they are abandoned and start to be covered by debris and by the mid-5th c. they collapse.¹⁹

In the Apennines, the cities of the interior show a rather different evolution. Literary sources, inscriptions, and archaeological evidence testify to at least one devastating earthquake

⁹ Savino 2005, 17, 66; Rotili 2017, 708.

¹⁰ Sgobbo 1938 for the inscription at the *caput aquae*; De Simone 2014, 134-6 for the bradyseism.

¹¹ De Caro 1999; Sirano 2016.

¹² Savino 2005, 207-11; Symm. *Rel.* 40; a similar characterisation is given in the *Expositio totius mundi* (LIII).

¹³ Aus. *Ordo nobilium urbium*, 8, 1-2.

¹⁴ Pavolini 1999, 181; Savino 2005, 219-222.

¹⁵ De Caro 1999, 223-6.

¹⁶ Ambros. 59 = *PL* 16, col. 1182; Symm. *Ep.* 7, 36 (396).

¹⁷ Arthur 2002, 11-21.

¹⁸ Savino 2005, 11; Petacco and Rescigno 2005, 145-159.

¹⁹ Camardo *et al.* 2003, 362; Savino 2005, 211; Camardo and Rossi 2005, 170-1.

in the mid 4th c..²⁰ Hieronymus says that it occurred in 346, before the solar eclipse (6 June), and lasted three days, destroyed Dyrrachium and affected many cities in Campania; it was even felt in Rome.²¹ Theophanes the Confessor, who writes much later but probably takes the information from the same Antiochene source as Hieronymus, specifies that 12 cities in Campania were hit by the event and an eclipse was seen in Antioch.²² There is less certainty about another, earlier earthquake, mentioned by George Hamartolos (or Monachos, AD 842-867). In fact the chronicler seems to repeat the same narrative as the Antiochene source, mentioning 13 cities in Campania struck by an earthquake, but he associates this event to another eclipse, which occurred on the 6 August 324, hence the probable confusion.²³ Lastly, Symmachus, in one of his letters which can be precisely dated to 375,²⁴ describes a flourishing (*maxima*) Beneventum, where the *optimates* compete in acts of euergetism to restore the city after an earthquake.²⁵ Most scholars have argued that this dates the event to just before Symmachus' visit, and so propose a date between 363 and 375,²⁶ but there is no reason to rule out associating it with the 346 earthquake. Proof of at least one seismic event comes from inscriptions mentioning restorations made by Fabius Maximus and Autonius Iustinianus after earthquake(s) in Allifae, Aesernia, and Telesia.²⁷ The actual archaeological evidence for earthquake damage in the 4th c. covers a wider area.²⁸ Strikingly, the archaeological evidence, like the epigraphy, points to a certain endurance on the part of these centres in the face of this catastrophe. At Beneventum, new city walls were created by cutting out the Cellarulo district and by progressively spoliating the amphitheatre.²⁹ At Aequeum Tuticum, a new villa, richly decorated with coloured mosaics, is set above the collapse of the earthquake, and is abandoned only at the end of the 5th c..³⁰ At Compsa, the rooms behind the cathedral are paved with new mosaics in the 4th c. and are only abandoned, along with the amphitheatre at the end of the 5th or in the early 6th c..³¹

At Abellinum, which is the most westerly city of the Apennines, the pattern on the one hand recalls that of the cities in the mountains, on the other that of the small cities in the plain. The centre experiences a gradual downturn. The baths cease to function before the middle of the 4th c..³² A *domus* near the city walls is partially abandoned after the earthquake and remodified into smaller dwellings.³³ The city walls, however, are partially, and patchily,

²⁰ Soricelli 2009.

²¹ Eus. *Hieron. Chron.* 236.14-16: "Dyrrachium terrae motu conruit et tribus diebus ac noctibus Roma nutavit plurimaeque Campaniae urbes vexatae". One earthquake cannot have lasted three days and affected such a vast area, but he might be describing a series of separate quakes.

²² Theophan. *Chronogr.* I, 37, 32-34.

²³ Soricelli 2009, 248.

²⁴ Torelli 2002, 271.

²⁵ Symm. *Ep.* I, 3, 3-4: "Privatam pecuniam pro civitatis ornatu certatim fatigant. Nam postquam terra movit, nihil paene illis reliqui factum est, sed fractae opes infractos animos reppererunt".

²⁶ Polara 1996 connects this letter of Symmachus to another (Symm. *Ep.* I, 10), in which he complains about the tumbledown conditions of his *pratorium* at Capua (because of an earthquake?), and the rushed restorations that followed. Similarly Torelli 2002, 271-277; Soricelli 2009, 249-250.

²⁷ *CIL* IX, 2338; *CIL* IX, 2638; *CIL* IX, 6429. Fabius Maximus (*PLRE* I, Maximus 35), *corrector* for the province of Samnium, is praised also for the construction/restoration of other public buildings in Bovianum, Iuvanum, Histonium, and Saepinum (Ward-Perkins 1984, 25; Soricelli 2009, 251-4). Autonius Iustinianus (*PLRE* I, Iustinianus 3) was also honoured at Anxanum and Venafrum.

²⁸ Galadini and Galli 2004.

²⁹ Rotili 2005, 44-6; Rotili *et al.* 2010, 309-314.

³⁰ Tocco Sciarelli 1999, 247; Colucci Pescatori 2005, 284.

³¹ Tocco Sciarelli 1999, 252; Colucci Pescatori 2005, 293-5.

³² Colucci Pescatori 1986, 126.

³³ Colucci Pescatori 1986, 127-132; 2017, 168-169.

restored.³⁴ As a religious centre, though, Abellinum continues to prosper: a church was built in the forum at the end of the 3rd or beginning of the 4th c.,³⁵ while at Capo La Torre, above the Roman necropolis, a sizeable Christian basilica developed in the first half of the 4th c.. Graves in and around the basilica, with inscriptions dated *ad annum*, show that it was used intensively from 347 to 558.³⁶

Back on the plains of Campania, the situation worsens significantly during the 5th c., culminating in the ‘Pollena eruption’. According to the ancient sources, at the end of the 4th c. the agriculture of the entire region experienced a sudden decline. In a document of Honorius dated to 395, it is stated that 1/7 of the cultivable land of Campania was abandoned and unproductive, with its owners unable to pay their taxes. Honorius ordered the burning of the registers of properties covering an area of 528,042 *iugera* (roughly 132,000 hectares),³⁷ which corresponds to an area as wide as all plains from the Mons Massicus to the Sorrentine peninsula. In 405/6 Paulinus of Nola mentions the migration of farmers from the area of Nola to the Apulian plains beyond Beneventum.³⁸ In 410, the precarious situation along the coastal plain was compounded by Alaric’s invasion. Following his sack of Rome, the Visigothic king advanced on Neapolis. The city had the advantage of being provided with strong city walls, which were then restored under Valentinian III around 440.³⁹ The countryside around Neapolis suffered instead and Nola was sacked.⁴⁰ The absence of city walls, in the face of the frequent barbaric raids in the region, is generally considered a key factor in the progressive abandonment of Puteoli too.⁴¹ However, the city was already struggling, with evidence of an epidemic in the area of the ancient acropolis (Rione Terra), the abandonment of the port, and the transition of the body of St Iuanarius to Neapolis between 413 and 431. Despite its walls, even Neapolis experienced hardship. Deposits dating to the 5th c. show that some roads in the city were covered by rubbish, especially at the port, which was affected by progressive progradation, with consequent shrinkage of the harbour.⁴² By the end of the century, massive sandy soils up to 1 m had built up (possibly in part as a consequence of the ‘Pollena eruption’).⁴³ Following Alaric’s death at Cosentia in Calabria, his successor Athaulf continued to occupy Italy during 411 and early 412, the effect of which was described by sources as like a plague of locusts.⁴⁴ Coastal Campania appears to suffer most, with Beneventum also assaulted, but Hirpinia seems to have been passed by.⁴⁵ Such was their impact that following the withdrawal of the Visigoths, Honorius granted five years of tax reduction to the whole of Campania twice, in 413 and in 418, bringing the total demanded down to 1/9 of the original amount.⁴⁶ This was not the end of externally imposed turbulence, however. In 439 Carthage fell to the Vandals and in 455 the Vandals sacked Nola and Capua, ravaged the surrounding farmland and ransomed or enslaved farmers by taking them to Africa.⁴⁷ Similar raids occurred in 458, in a combined Vandal and

³⁴ Tocco Sciarelli 1999, 248.

³⁵ Tocco Sciarelli 1999, 248.

³⁶ Fariello and Lambert 2009.

³⁷ *Cod. Theod.* 11.28.2.

³⁸ Paulin. *Carm.* 20.312-7.

³⁹ *CIL* X 1485, backed by the architectural remains (Giampaola *et al.* 2005, 231).

⁴⁰ Aug. *De civ. Dei* 1.10.

⁴¹ Arthur 2002, 10; Savino 2005, 223-4.

⁴² De Caro 1999, 231.

⁴³ Giampaola *et al.* 2005, 226-8.

⁴⁴ Iord. *Get.* 159: “Qui (*scil.* Athaulf) suscepto regno revertens item ad Romam, si quid primum remanserat, more locustorum erasit, nec tantum privatis divitiis Italiam spolians, immo et publicis...”

⁴⁵ *CIL* IX, 1596 = *ILS* 5511. Torelli 2002, 288.

⁴⁶ *Cod. Theod.* 11.28.7, 11.28.12.

⁴⁷ Greg. Mag. *Dial.* 3.1; Paol. Diac. *Hist. Rom.* 14.18. On the risks of raids on the Campanian coast, see Sid. Apoll. *Carm.* 5.388-392. Rotili 2017, 714.

Moorish assault, and in 463.⁴⁸ These attacks were rapid and centred on the coastal plains but in 467 a violent plague spread throughout Latium et Campania.⁴⁹

The century and a half prior to the ‘Pollena eruption’, therefore, was one of extreme upheaval. Many of the smaller cities of the coastal plain were largely abandoned and others sacked. Arthur estimates that half of all Roman towns in southern Italy are abandoned between the 4th and 6th c..⁵⁰ Naples itself withstood some of these pressures, as did some inland centres, though many were devastated by the mid-4th c. earthquake. Nevertheless, the cursory summary provided so far highlights a range of reactions to these hardships. The ‘Pollena eruption’, by sealing and preserving varied urban and rural sites, allows us to clarify and better specify exactly what was occurring between the plains of the volcano and the inner Apennines, which can in turn help reveal the underlying trends or forces that generated this mishmash of outcomes.

The ‘Pollena eruption’ (GFDS)

What we know of the ‘Pollena eruption’ is derived both from volcanological, archaeological and literary evidence, the relative value of which has been widely debated.⁵¹

On the ground, this eruption has left behind a distinctive combination of deposits. These include primary deposits, notably tephra falls (ashes and lapilli), but also secondary deposits, caused by events such as lahars (mud/debris flows) and debris avalanches or landslides. These secondary events both cover primary deposits and in some cases carve them away, often creating deep channels. This can make accurately tagging and dating volcanic sequences difficult and since each of these hazards behaved differently and interacted with the geomorphology and built structures in a very specific way, the final deposits visible in the stratigraphy vary considerably even in the same area. Since the ‘Pollena eruption’ was the first eruption of a late antique eruptive cycle, however, the deposits associated with it are often quite easily distinguished stratigraphically, at least from what came before.

Based on the primary deposits associated with this eruption, it began with a column of hot tephra rising up to 12-20 km into the atmosphere, with some volcanic scoria falling and piling up to 2.5 m on the slopes of the volcano.⁵² The column then collapsed, generating pyroclastic currents (gas mixed with volcanic ashes), which travelled as far as 10 km from the centre, while another column rose. Lastly, the magma mixed with the aquifer and generated pyroclastic currents. The total calculated volume of fall deposits from the ‘Pollena eruption’ has been variously estimated at 0.5 km³, 1.2 km³ and 1.38 km³.⁵³ The higher tephra reached the stratosphere, were pushed by strong winds towards east, and reached Constantinople, while those at a lower altitude were moved by the meteoric winds in ENE direction. Closer to the volcano, from its slopes up to 3-4 km ENE from it, the fall unit varies from 1-2 m in thickness, while 30 km away it progressively thins down, covering an area as wide as 935.6 km² with up to 0.3 m (see Fig. 1).⁵⁴ It is more difficult to analyse and trace the pyroclastic currents, as their

⁴⁸ Sidon. Apoll. *Carm.* 5.385-440; Càssola 1991, 144; Pavolini 1999, 181; Torelli 2002, 281-2; Savino 2005, 79-86.

⁴⁹ Ruggini 1961, 467-8; Gelas., *Adv. Andr. Sen.*, P.L. 59, col. 113.

⁵⁰ Arthur 1999, 173.

⁵¹ Colucci Pescatori 1986, 137-8; Pagano 1995-6, 35-7; Albore Livadie *et al.* 1998, 71; Mastrolorenzo *et al.* 2002, 23, 33.

⁵² The key volcanological studies of the eruption are Rosi and Santacroce 1983; 1986; Mastrolorenzo *et al.* 2002; Rolandi *et al.* 2004; Sulpizio *et al.* 2005; Bonasia *et al.* 2010.

⁵³ In order, by Mastrolorenzo *et al.* 2002, Rolandi *et al.* 2004, and Sulpizio *et al.* 2005.

⁵⁴ Rolandi *et al.* 2007, 90. As term of comparison, this area is one third of that covered by the ‘Pompeian eruption’.

distribution and thickness is strongly affected by the previous geomorphology, which remains mostly unclear. Pyroclastic flows are hot currents of volcanic gas and particles, which travel at high velocity causing, among other effects, asphyxia and fires. The pyroclastic flows of this eruption are clearest on the northern slopes of the volcano and are confined to 5 km from the present vent; they accumulated especially in the palaeovalleys, where they reach up to 10 m of thickness, while decrease unevenly to 1 m at about 80 m above sea level.⁵⁵

Due to the poor stability of the new volcanic deposits and heavy rains caused by the increased temperatures in the atmosphere, lahars and debris avalanches affected a wide area and probably continued for a several days or weeks after the eruption. Among these secondary effect lahars are the most destructive, as they transport a massive amount of volcanic debris mixed with soil and water. Like pyroclastic currents, they follow the topography, travel fast (but are not hot), and their kinetic energy reduces abruptly as the flows reach the flatter land. Lahars do not only fill gullies, but also create channels, and their strength and path is severely affected by built structures. For the ‘Pollena eruption’, these are again mostly noticeable on the northern flank of the volcano. They spread as far as 10 km from the vent, though the depth of the deposits drops away 6-7 km from the current vent.⁵⁶ Away from the volcano, other topographic heights (mountains and hills) around the plains of Vesuvius were affected by heavy rains, which generated movement of volcanic deposits (lahars), landslides (debris avalanches), and filling of streams and rivers, creating largescale flooding. The plains around Nola and Acerrae, crowned by hills and characterised by lowlands, streams, and the springs of the river Sebethus, were thus flooded for an area 200 km² wide, in some points by debris as thick as 2 m.⁵⁷ Towards Neapolis, this debris filled the river Sebethus to a depth of around 1 m and probably generated the marshes, which played a key role in the economy of that city until the 19th c..⁵⁸ Within the city itself, mud mixed with volcanic deposits (from the Phlegraean Fields but demobilised by the Vesuvian eruption) descended from the hills and covered part of the city and the port.⁵⁹

Deposits associated with the ‘Pollena eruption’ can be identified across a wide region, and finds associated with these deposits can be used to date them. ¹⁴C dating of charcoal remains within the deposits suggests a date between AD 350 (±50) and 430 (±60), while the pottery assemblages buried by them indicate a date in the third quarter of the 5th c..⁶⁰ Literary sources mention three volcanic events at the end of the 5th and beginning of the 6th c.: one on the 6 November 472,⁶¹ another on the 9 November 505, and a third on the 8 July 512.⁶² There are good reasons to consider these dates as reliable.⁶³ The source for the 472 eruption is Marcellinus Comes, who wrote his chronicle in 518; he generally takes his information from official documents in Constantinople and mentions other natural catastrophes for which there have been positive matches. Since the eruption produced an ashfall in Constantinople itself (1200 km from Vesuvius), which was commemorated by an annual procession, its occurrence

⁵⁵ Gurioli *et al.* 2010, 1032.

⁵⁶ Perrotta *et al.* 2006.

⁵⁷ Albore Livadie *et al.* 1998, 44.

⁵⁸ De Simone 2004, 93; Sulpizio *et al.* 2005.

⁵⁹ De Simone 2004, 74-75.

⁶⁰ Albore Livadie *et al.* 1998, 67; Martucci *et al.* 2018, 368, despite the presence of the dish Hayes 104A, found in a few contexts (e.g.: Mukai *et al.* 2010, 230).

⁶¹ Marcellinus Comes (*Chronicon*, M.G.H., A.A. XI, 90): “Vesuvius mons Campaniae torridus intestinis ignibus aestuans exusta evomit viscera nocturnisque in die tenebris incumbentibus omnem Europae faciem minuto contextit pulvere. Huius metuendi memoriam cineris Byzantii annue celebrant VIII idus Novembr.”

⁶² *Paschale Campanum* (M.G.H., A.A. IX, 330): “a. 505: Mons Besubius eructuavit V id. Novembres; a. 512: hoc anno in k. Iul. Sol eclipsim passus est et monte Besuvio ardente VIII id. Iulias tenebraefactae sunt per vicinium montis.”

⁶³ Savino 2004; De Carolis and Soricelli 2005; De Simone *et al.* 2011.

was recorded also in later Byzantine and middle eastern sources. Some of these provide a different date, ranging between 429 and 474, though all agree that it occurred in the 5th c..⁶⁴ Procopius, while describing a later eruption of Vesuvius that occurred in 536, also makes reference to a previous eruption which caused an ashfall in Constantinople.⁶⁵ Similarly Cassiodorus, in a letter dated between 507 and 511, describes both a vast earlier eruption and also a smaller, more recent one (most likely that of 505).⁶⁶ Therefore the AD 472 eruption is confirmed by multiple passages stemming from diverse sources. The exact date must remain approximate but is unlikely to have been after 474 at the latest. The main source for the later eruptions of Vesuvius, in 505 and 512, is the anonymous writer of the *Paschale Campanum*, who is generally thought to have lived in Campania in the 6th c..⁶⁷ The eruption that occurred in 505 fits with Cassiodorus' description of a small eruption in this approximate period, while that of 512 is mentioned also in another source.⁶⁸

There were almost certainly other smaller eruptions during this period that have not been recorded but the surviving data seem to indicate that the AD 472 eruption was the first of an eruptive cycle and, as such, was also the most destructive. This AD 472 eruption and the 'Pollena eruption' that be identified volcanologically and archaeologically are now widely considered one and the same. The effects of the eruption were both diverse and unevenly spread. Close to the volcano, it was catastrophic but by tracking the fall deposits we can also assess its wider impact. In what follows, three areas will be considered: the north slope of Somma-Vesuvius; the plains between here and the edge of the Apennines; and finally the inland region of Hirpinia. These volcanic deposits provide an insight both into the character of the eruption and the landscape of the region in the wake of the turbulence of the previous centuries.

The northern slopes of the volcano (GFDS)

The 'Pompeian eruption' of AD 79 did not affect the two sides of the Vesuvian plain in equal fashion, leaving vast portions of the northern plains untouched. More importantly, the cities of Neapolis and Nola suffered solely from the side-effects of the eruption, mostly earthquakes, and so their populations managed to recover from the disaster and resettle the countryside. In this area, new villas start being built right on top of or near pre-79 sites and continued to be in use right up to AD 472.⁶⁹ Our understanding of the settlement pattern and its changes over time is still patchy, due on the one hand to the considerable changes in the landscape, especially on the slopes of the volcano after many eruptions, and on the other to the spread of urbanisation from the 1950s onwards, which made the province of Naples the most-densely populated in Europe. In general terms, however, after AD 79 the sites along the northern slopes of Vesuvius were fewer, but bigger. Despite the volcanic deposits of AD 79, which at about 100 m a.s.l. are

⁶⁴ De Simone *et al.* 2011, note 25.

⁶⁵ *Bell. Goth.* II, 4, 76C.

⁶⁶ Cass., *Var.* IV, 50: "Volat per inane magnum cinis decoctus et terrenis nubibus excitatis transmarinas quoque provincias pulvereis guttis compluit, et quid Campania pati possit, agnoscitur, quando malum eius in orbis alia parte sentitur."

⁶⁷ Croke 2001, 314.

⁶⁸ De Simone *et al.* 2011.

⁶⁹ E.g. the villas in San Sebastiano al Vesuvio (Cerulli Irelli 1965) and in Ponticelli, Cupa Pironti (De Stefano and Carsana 1987).

2-2.5 m. thick (though they thin down rapidly towards the plain), the centuriation grids still affect the settlement process and the main road axes remained in place.⁷⁰

The 5th c. picture on the north slopes of Vesuvius is not easily reconstructed. In some instances, settlements can be proposed by the concentration of burials⁷¹ or remains of ploughing furrows,⁷² but currently it cannot be established whether the structures associated with them were made in masonry or in more ephemeral materials. Against this background, noteworthy are the only two academic excavation projects in the area, which have both brought to light post-79 Roman villas, in the modern towns of Pollena Trocchia and Somma Vesuviana respectively. Both of these villas were buried by tephra and several metres of lahar deposits associated with the AD 472 eruption, and then overwhelmed even further by deposits from a subsequent eruption, which buried them up to roof level, resulting in an excellent state of preservation and rich archaeological datasets.

The villa with baths of Pollena Trocchia (località Masseria De Carolis) is the earliest post-79 site ever found and the one providing the largest pottery assemblage of the 5th c. in Campania (Fig. 2).⁷³ It was probably built on the site of an earlier villa, to judge from fragments of frescoes and 1st c. AD potsherds under the AD 79 ashes. What has been brought to light so far consists of at least 11 rooms, mostly pertaining to the baths of a sizeable villa (Fig. 3). It was probably built on a hillock, right above the volcanic deposits of AD 79, which here are about 2 m thick. These deposits were deemed solid enough to operate as foundations, so the walls of the baths were set, freestanding, right above the hypocaust floors; soon after other walls with deep foundations were added as buttresses. The stamp of Cn. Domitius Lucanus and Cn. Domitius Tullus (DVO.DOM) on the hypocaust tiles points to a date towards the end of the 1st c. or beginning of the 2nd c. AD (as they started producing together when their adoptive father died in AD 59 and finished after Lucanus' death in 94).⁷⁴

At the time of the eruption in AD 472, the villa at Pollena was in partial state of abandonment. The baths were no longer in use; part of the ceiling had already collapsed, been removed and deposited along the northern walls. The standing walls were in the process of being spoliated, in some places with the complete removal of the bricks or lava blocks, in others by scratching the bricks to get terracotta chips, possibly for replastering with *cocciopesto* other parts of the site. Climbing vines were growing along the walls and most of the rooms were being used as rubbish dumps or as cemeteries, as many infant burials in amphorae show. The pottery assemblage mostly pertains to the last phase before the eruption, that is the third quarter of the 5th c.. Overall, it appears highly fragmented in the areas used as rubbish dumps, less so in the rooms probably still used for other activities (P and R). The classes and forms are mostly polarised around consumption rather than production or transportation, while regional and Vesuvian pottery (Fig. 4 no. 1-3) is much more present than imports (Fig. 4 no. 4-6);⁷⁵ this is true even in comparison to the city of Neapolis itself, despite the short distance between the

⁷⁰ De Simone 2004.

⁷¹ E.g.: 5 burials at Sant'Anastasia, Via Rosanea (Parma and Gifuni 1988); 8 at Ercolano, Via Doglie (Pisapia 1981); 35 at Palma Campania, località Jerola (De Simone *et al.* 2011, 62).

⁷² De Simone *et al.* 2011, 62.

⁷³ Key publications: De Simone *et al.* 2009a; De Simone *et al.* 2009b; De Simone *et al.* 2018.

⁷⁴ Bloch 1947, no. 267; Kehoe 1988, 51-52.

⁷⁵ The cooking casserole in Fig. 4, no. 1, is type Carminiello 12 (Arthur 1994, 230-232, fig.110, 12), no. 2-3 are type Carminiello 2 (Arthur 1994, 223-224, fig.103, 2). The ARS bowls in Fig. 2, no. 4-6 are respectively types Hayes 70 (variant), 91A, 61A (Hayes 1972, 119, fig.21,9; Atlante I, 104-105, t.48, n.15; Hayes 1972, 100-107, fig.17.7).

sites. The comparison with other assemblages indicate that the countryside in this territory was mostly self-sufficient in terms of both agriculture and ceramic production in the 5th c., but that some imports continued to circulate quite widely. The assemblage from Pollena is crucial, in fact, for understanding wider commercial dynamics in this region in the 5th c..⁷⁶

The AD 472 eruption buries in similar fashion both the Roman villa at Pollena Trocchia and that at nearby Somma Vesuviana (località Starza della Regina) (Fig. 5), first with a level of airfall deposits (tephra), then ashes from pyroclastic flows, followed by a massive volcaniclastic deposit, caused by lahars, which partially wash out the previous deposit. The flow of the lahars, which was affected not only by the geomorphology but also by the built structures, thickens and thins rapidly even between neighbouring rooms. The villa at Somma Vesuviana, which is commonly known as Villa of Augustus, as of now encompasses 10 rooms built on three terraces.⁷⁷ The core part of the masonry was built in the second half of the 2nd c. AD, with the creation of the large apse and the smaller apsidal room a couple of generations afterwards (Figs. 6-7). These rooms, paved with mosaics and opus sectile, and embellished with frescoes and statues related to Dionysus (probably as a statement of the return of the whole area to its previous economic vocation), were used as a monumental entrance to the villa itself. In mid-4th c., substantial changes take place, mostly to adapt the bulk of what is visible to agricultural production, mostly for wine processing. Indeed the terraces offered the opportunity to create an efficient *torcularium*, following the instructions of Palladius (I, 18), where the different heights could speed up the transfer of the grape juice from the wine presses to the wine cellar, as well as the recovery of the must and wine, possibly leaking from the wooden barrels, back to the cellar. In order to achieve this, a consistent set of pre-79 *dolia*,⁷⁸ either from another site or from an earlier part of the building, were brought and placed at the lower level; channels were created by doubling the terrace wall and through cuts in the pavement of the middle terrace, back to where the presses probably were. Furthermore, the mosaic pavement of the largest hall, on the upper terrace, was replaced in its eastern half by a cocciopesto floor and a low curb, under the niche where the statue of Dionysus still stood. This area was probably used to store the wooden barrels, as traces of pitch, resin, charcoal, and most importantly a pipe connecting this vat to the lower channels indicate. Meanwhile, the adjacent room was transformed into a shed with a trough and a storage area consisting of *dolia* placed in the cut pavement, which were found to have been filled with olives and walnuts. In mid-5th c., in the main room two ovens were set. In AD 472, despite some traces of hardship – like climbing vines on one of the outer walls, the collapse of a roof, and the partial spoliation of the lava blocks forming the pillars of an arcade – the site was still operating, as evidenced by a new oven built above the collapsed roof and the addition of wooden pillars to replace the spoliated lava blocks. More importantly, no traces of largescale spoliation are apparent and traces of ploughing furrows were uncovered just beyond the built-up area. The artefacts and ecofacts show similarities, but also interesting differences, with what has been found at Pollena Trocchia. Indeed despite being considerably vaster than the villa in Pollena Trocchia, the artefacts unearthed at Somma are considerably fewer in quantity but better in state of preservation. This confirms the general picture that the villa at Somma was still active, rather than a dump like the villa at Pollena. The charcoal remains also confirm the different hierarchy of the two sites: at Pollena, the charcoal indicates that mixed tree species from the around the site were used for both timber and field, while at Somma Vesuviana the species are drawn from the higher slopes of the volcano and even the Apennines.

⁷⁶ On this point, De Simone *et al.* 2013; Martucci *et al.* 2014; De Simone and Martucci 2016; Martucci *et al.* 2018.

⁷⁷ Key publications: Aoyagi *et al.* 2005-2006; De Simone 2010; Aoyagi *et al.* 2015; Aoyagi *et al.* 2018.

⁷⁸ CN AEVI / MYSTICI (CIL X, 8333.3); C IVLI / CRISPI (CIL IV 10788); L LVCCEI / PROCLI.

In sum, these sites show two different responses to the hardships experienced throughout the 5th c.. Both sites exploited the situation post-79 but by AD 472 the villa at Pollena Trocchia had been partially abandoned, while at Somma Vesuviana the villa had been turned over to largescale agricultural production. Comparable variation can be found further to the east, between the volcano and the Apennines, highlighting the varied responses of different groups to the wider economic and political situation.

The Sarno and Nola plains and the edge of the Apennines (GFDS & BR)

As one moves east from Vesuvius the evidence for the impact of the ‘Pollena eruption’ becomes understandably patchier. Excavation data, mostly drawn from rescue excavations of limited scope, however, do provide information on the depth and formation of the volcanic deposits.

The most detailed data regarding the depth of volcanic deposits across this area are provided by Mastrolorenzo *et al.*, who record stratigraphic sections from twelve sites in the Sarno and Nola plains and a further four on the western flanks of the Apennines.⁷⁹ These sections show that the depth of the tephra fallout varied considerably at different sites, as did the impact of secondary volcanoclastic events. Around Nola, the lowest layer of stratified lapilli and ash ranges in depth between 21 cm at Cimitile and 33 cm in areas of Nola.⁸⁰ At two sites in Nola, further deposits of ash and lapilli associated with pyroclastic surges, 4-10 cm thick, were also observed.⁸¹ Across this territory, secondary volcanoclastic deposits of much greater depth are attested. These vary between 36 cm and 3.5 m at Nola and between 39 cm and 2.44 m at Cimitile.⁸² The bulk of these secondary deposits are ash-rich and associated with debris flows. To the north, around Tufino and at Avella, the deposits of ash and lapilli recorded range between 19 and 44 cm in depth, with secondary volcanoclastic deposits again more significant, between 23 cm and 2.1 m.⁸³ A similar picture is observable around Visciano, with ash and lapilli deposits ranging between 16 and 48 cm in depth and secondary volcanoclastic deposits, rich in scoria, between 38 cm and 1.37 m.

The structures and deposits sealed by these volcanic layers on the Nola and Sarno plains largely support the picture of urban abandonment outlined above and suggest that economic turmoil coupled with Visigothic and Vandal incursions did have a genuine impact. Many of the structures covered by the ash were certainly already ruins. This is the case at Sarno, where the bases of the walls of a Roman building had already been covered by a silt deposit prior to the eruption and their upper portions presumably removed.⁸⁴ At Nola too, the steps of the amphitheatre are covered by thin alluvial deposits beneath the volcanic ones.⁸⁵ Inside, the marble wall revetment was in the process of being stripped off for re-use elsewhere when the eruption struck (Fig. 8).⁸⁶ New work across Nola, in fact, indicates that much of the city had been abandoned prior to the eruption, with the population either moving elsewhere or

⁷⁹ Mastrolorenzo *et al.* 2002.

⁸⁰ Mastrolorenzo *et al.* 2002, 23 Table 1 (Unit AL).

⁸¹ Mastrolorenzo *et al.* 2002, 22 Fig. 2 (Sites XI and XIII), 23 Table 1 (Units SL and S); on the range of observable depths, Sampaolo 1986, 116.

⁸² Mastrolorenzo *et al.* 2002, 22 Fig. 2 (Sites XI-XIV (Nola) and XV-XVI (Cimitile), 26-27 Table 12.

⁸³ Mastrolorenzo *et al.* 2002, 22 Fig. 2 (Sites XVII-XIX).

⁸⁴ Mastrolorenzo *et al.* 2002, 32, fig. 6b.

⁸⁵ Mastrolorenzo *et al.* 2002, 32, fig. 6g; on the abandonment of amphitheatres elsewhere, Ward-Perkins 1984, 93.

⁸⁶ Albore Livadie *et al.* 1998, 67-82; Mastrolorenzo *et al.* 2002, 32, fig. 6d; Cesarano 2018, 11, fig. 1.

dispersing into the countryside and public and private buildings being abandoned.⁸⁷ Even beyond the walls there are signs of abandonment. The suburban villa uncovered at Via Saviano 147, located just outside the walls, was already ‘un cumulo di macerie con tracce di incendio’ when the eruption occurred.⁸⁸ Just NW of Nola, the villa on the Via Saccaccio also seems to have fallen into a state of disrepair prior to AD 472, perhaps in response to either the Visigothic or Vandal assaults.⁸⁹ This process of urban exodus had started as early as the 4th c., with the centre of gravity on the Nola plain shifting from Nola itself towards the important Christian centre of San Felice, to the north of the city, at Cimitile.⁹⁰ Spoliated material from the city was certainly employed in construction at Cimitile.⁹¹ Fresh plough furrows filled with volcanic material documented at Cimitile show that here at least the annual cycle of agricultural activities had not been broken by AD 472.⁹²

The three remaining sites examined by Mastrolorenzo *et al.* provide contrasting pictures. At Palma Campania, closer to Vesuvius than the sites on the Nola plain, primary deposits associated with both the first phase of the eruption and later pyroclastic surges were found to a depth of 68 cm and sealed by 30 cm of secondary deposits. At Quindici, at the upper end of the Valle di Lauro, the deepest primary deposits at any site beyond the edge of Vesuvius itself were recorded: 127 cm of ash and lapilli from the first phase and a further 48 cm of ash fallout from the final phase of the eruption sequence. One of the key sites covered by this ash was a lavish villa with baths at Lauro. The villa itself was spoliated and destroyed at the end of the 14th c. by Nicolò Orsini in order to create the church and convent of San Giovanni in Palco, while the remains of the baths, built on three terraces, were excavated in 1981-1985 (Fig. 9). The baths were built during the Tiberian age and embellished with a *nymphaeum* with blue glass mosaics (Fig. 9, no. 29). The villa was covered by roughly 1 m of ash and lapilli in AD 472 but the remains beneath these deposits show that, while part of the villa was in the process of being spoliated, the *nymphaeum* was partially transformed into an oil pressing facility (Fig. 9, no. 26-27).⁹³ On the promontory above Lauro, the villa of Monte Donico at Taurano, although published only in a brief report, presents a similar picture of both partial abandonment and continued occupation. The bath complex at the site had fallen into disrepair prior to AD 472, part of the paving covering the *suspensurae* had been removed, and a burial dug into the hypocaust.⁹⁴ All of these remains were sealed by the volcanic layers. At the same time, in the adjacent areas, the same ash fell directly on the pavements, indicating that the spaces were still in use. The central courtyard had been turned over to industrial activities, with the inclusion of a lime kiln, perhaps in connection with the spoliation of part of the villa. Agricultural activity is suggested by a *dolium* east of the residential rooms and the ceramics from the layers beneath the ash include ARS, Slipped Ware and a range of coarse and cooking wares datable to the 4th and 5th c. AD.⁹⁵

Finally, at Abellinum, Mastrolorenzo *et al.* were able to record a bed of scoria lapilli and ash c. 30 cm deep.⁹⁶ This accords well with the depth of 26 cm recorded by Rosi and Santacroce on the western outskirts of Avellino and Rolandi *et al.*’s observation that fallout

⁸⁷ Albore Livadie *et al.* 1998; and for more recent results, Cesarano 2018, 14.

⁸⁸ Cesarano 2018, 13-14, fig. 3.

⁸⁹ Sampaolo 1986, 113-16; Lubrano *et al.* 2011-12, 226.

⁹⁰ Rotili 2017, 721; Ebanista 2003, 561-563.

⁹¹ Ebanista 2003, 145, 566.

⁹² Mastrolorenzo *et al.* 2002, 32, fig. 6c.

⁹³ Johannowsky and La Forgia 1983; Johannowsky *et al.* 1986, 87-96.

⁹⁴ Festini and Porcaro 1998, 72.

⁹⁵ Festini and Porcaro 1998, 73 n. 12; and on this material in context, De Simone *et al.* 2013, 974.

⁹⁶ Mastrolorenzo *et al.* 2002, fig. 2 (Site XXVI).

from the first phase of the eruption is 30 cm thick in the region.⁹⁷ A series of small excavations in and around the ancient city, most of them rescue excavations in the necropoleis, have also identified volcanic layers. In the southern necropolis, excavated along the Via Cesinali, these volcanic deposits have been carefully documented in two sections published by Colucci Pescatori.⁹⁸ In the first, three distinct layers are noted: a band of fine greenish irregular pumice lapilli, c. 28-35 cm thick; a layer of ash, 19-26 cm thick; and finally a clearly secondary deposit of ash mixed with sand, 44 cm thick.⁹⁹ A second portion of the same section revealed a layer of lapilli, 24-27 cm thick, covered by compact ash, 7-39 cm thick.¹⁰⁰ Within the city, a similar sequence has been identified, of pumice lapilli 40-60 cm thick, compact ash 45 cm thick, and then redeposited ash and sand 35 cm in depth; here the depth of the deposits is a result of the fact that they accumulated in a natural depression.¹⁰¹ The *vallum* surrounding the city walls also contained substantial quantities of pumice, 1.5 m thick, though in this case certainly deposited here secondarily. These deposits suggest that the measurements by Rosi and Santacroce or Mastrolorenzo *et al.* for the region around *Abellinum* should be regarded as minima. The lowest volcanic deposits recorded in the necropolis, which can be associated with the first phase the eruption, range in depth between 24 and 35 cm and so are close in depth to the deposits recorded by these studies, as well as the 30 cm deposit noted by Rolandi *et al.* from near the city. However, in the Via Cesinali excavations at least, further ash deposits were found on top, in some cases up to a depth of 39 cm.

By AD 472, most of the centre of *Abellinum* had been abandoned.¹⁰² Attention seems to have moved away from the city centre to the suburbs and, in particular, the major basilica of S. Ippolito at Capo la Torre.¹⁰³ There was still a substantial population using this basilica, however, and people were still being buried in the other necropoleis. In the Via Cesinali excavations, the volcanic layers covered walking surfaces associated with the 5th c. necropolis.¹⁰⁴ A series of eleven tombs built between the *vallum* and the city walls were also directly covered by the eruption, indicating that they too are 5th c. in date.¹⁰⁵ And a group of 20 tombs exposed on the Contrada Spagnola were also directly covered by primary volcanic material.¹⁰⁶

New evidence from Aeclanum (BR & GFDS)

Abellinum, 35 km from Vesuvius, is the most easterly site examined in any of the existing volcanological studies of the 'Pollena eruption'. The fact that excavations here suggest the depth of deposits could be greater than has been appreciated, however, and a passing reference to the discovery of ash layers in the amphitheatre at Beneventum, without further elaboration, suggests that the impact of the eruption could have been felt considerably further east.¹⁰⁷ New data from *Aeclanum* and its vicinity, a further 20 km NE of *Abellinum*, confirm this.

⁹⁷ Rosi and Santacroce 1983, 250; 1986, fig. 19 (Site 30); Rolandi *et al.* 2004, 294.

⁹⁸ Colucci Pescatori 1986, 123.

⁹⁹ Colucci Pescatori 1986, 123, fig. 6: Section IIa.

¹⁰⁰ Colucci Pescatori 1986, 124, fig. 7: Section IIb.

¹⁰¹ Colucci Pescatori 1986, 127.

¹⁰² Colucci Pescatori 2017, 168-169.

¹⁰³ Fariello Sarno 1991; Fariello and Lambert 2009, 55-56, 63; Colucci Pescatori 2013; 2017, 169-170.

¹⁰⁴ Colucci Pescatori 1986, 124.

¹⁰⁵ Colucci Pescatori 1986, 127.

¹⁰⁶ Fariello and Lambert 2009, 54.

¹⁰⁷ Tocco Sciarelli 1999, 246; the possible wider impact of the eruption in Hirpinia is suggested but not developed in Pagano 1995-6, 37; 1997, 71.

The bulk of the archaeological remains at Aeclanum were uncovered during large-scale excavations directed by Giovanni Onorato in the 1950s and 1960s and Gabriella d'Henry in the 1970s and 1980s.¹⁰⁸ These were concentrated on a substantial residential zone in the centre of the city but also uncovered large second-century baths and a *macellum*, as well as a substantial Christian basilica. No record of the discovery of volcanic layers survives from the limited documentation relating to this work. Only during the excavations close to the entrance to the site between 2006 and 2009, in an area then thought to be adjacent to the city's forum, was tephra associated with the eruption identified archaeologically.¹⁰⁹ These unpublished excavations, directed by Roberto Esposito and funded by the Sergio Tacchini company, came down on the spoliated remains of a large public building with an aedicular façade, which has since been identified as the proscenium of a theatre. Substantial remains of the architecture of the *scaenae frons* and its revetment, as well as an over-lifesize imperial statue in white marble, previously identified as Marcus Aurelius but now thought to be Domitianic, were found in a rectangular space behind the proscenium.¹¹⁰ The volcanic deposits lay on top of the architectural elements and statue found here.¹¹¹

New excavations at Aeclanum, begun in 2017, have expanded this picture further (Fig. 10).¹¹² Excavations in the theatre, in the large baths, and in the *macellum* have uncovered 5th c. layers and, in the theatre and the baths, both primary and secondary volcanic deposits. In the baths, the primary volcanic deposits encountered were concentrated in a space (Room 10) to the north of the *frigidarium* (3) (Fig. 11). This section of the baths has been extensively spoliated and the eastern edge of the room is truncated by a later cut. Despite these later interventions, there is considerable evidence for restoration and modification work in this area of the baths, much of it apparently dating to the 4th c. and probably a response to the AD 346 earthquake.¹¹³ This continued interest and investment in bathing complexes in the 4th and even 5th c. is paralleled elsewhere in central Italy: at Anzio, Interamna Lirenas, Oriculum, Puteoli, Saepinum, Tarracina and Trebula the baths were restored by provincial governors, while baths also featured among the buildings restored by Fabius Maximus, mentioned already above.¹¹⁴ The emperors Arcadius and Honorius even requested that funds from municipal land be assigned to the repair of public buildings and heating system for baths.¹¹⁵ At Aeclanum, these interventions included the raising of the floor level, the installation of a new mosaic in Room 8, and the addition of the pool in Room 9. The floor level of Room 10 also seems to have been raised in the same period and throughout the complex there is evidence for the relaying of marble paving. *Verde antico*, one of the most fashionable late-antique marbles, was widely employed and it is possible that the various statues found in the baths in the middle of the 20th c. and before this, were erected here during this phase of remodelling, even though they are earlier in date.¹¹⁶ This was not an Imperial-period complex that was drifting into decay by the 5th c., therefore, but a relatively newly restored and still lavishly decorated structure, apparently still in use.

¹⁰⁸ Onorato 1960; for a summary of this work, Colucci Pescatori and Di Giovanni 1999.

¹⁰⁹ On this point, Lo Pilato 2010, 352.

¹¹⁰ On these finds, Mesisca *et al.* 2013; Mesisca 2015; Avagliano 2017b.

¹¹¹ Colucci Pescatori 2017, 174.

¹¹² De Simone and Russell 2018; Strapazzon *et al.* 2017.

¹¹³ De Simone and Russell 2018, 300.

¹¹⁴ Ward-Perkins 1984, 20-7; Soricelli 2009, 251-4; Christie 2006, 199; 2011, 131-132.

¹¹⁵ *Cod. Theod.* 15.1.32.

¹¹⁶ On these statues, Avagliano 2017a.

The volcanic deposits were found on the marble paving of Room 10 and consisted of fine stratified ash.¹¹⁷ The ash layer here measured just 10-12 cm thick and lay either directly on top of the marble paving or was in places separated from it by an extremely thin layer of mid-brown silt, 1-2 mm thick. This small build-up could have resulted from the heavy rains brought on by the eruption; there is not enough material here to suggest that the building was lying empty. A scatter of rooftiles was found lying in the ash – on it and covered by it – indicating that they fell during the eruption rather than before it; they probably slid off one of the roofs surrounding the space and show that the structure experienced at least some minor damage during the eruption (Fig. 12). Secondary volcanic deposits were recovered in the *frigidarium* (3), in the pool in Room 9, and at a higher level in Room 10; the ash that fell in the 5th c. was redeposited for centuries afterwards. The fact that only secondary volcanic deposits, apparently post-dating later spoliation, were found in the *frigidarium* and the pool in Room 9 shows that these spaces were still roofed in AD 472, unlike Room 10, which must have been open-air.

While just one layer of ash was identified in the baths, in the theatre two or three layers of primary volcanic deposit were discovered (Fig. 13). These primary deposits all came from Trench 5b, which exposed three bays (Rooms A-C) of the exterior of the *cavea*. The lowest of these layers consisted of coarse ash formed predominately of small pieces of scoria and occasional lithics and crystals, 8-11 cm thick. The middle part of the deposit was formed of fine stratified ash, 18 cm thick, identical to the deposit from the baths. The top of the sequence was eroded away but vestiges of a third layer, similar to the lower layer of coarse ash was visible in places. This stratigraphic sequence was most clearly exposed in section, in the northern edge of a later spoliation trench (A) encircling the *cavea* of the theatre. This deposit, preserved for 1.28 m in length before it is truncated by a second spoliation trench (C) at its western limit, had built up outside the theatre. It did not extend into the northern or middle bays (Rooms A and B) of the substructures of the *cavea* (see Fig. 13), however it was found in the southern bay (Room C), directly on top of an occupation layer and cut on its north side by the same trench that cut the southern edge of the deposit visible in section. This would seem to indicate that not all of the bays of the substructures of the *cavea* were either roofed or closed off in the same way by this date, as will be discussed below. Elsewhere in the theatre, the only area where substantial quantities of volcanic material were discovered was in the fill of a ring drain running around the outside of the orchestra, which was exposed in the northern extension of Trench 5a. The fill of the drain consisted of six alternating layers of light yellowish brown clay and secondary ash deposits, the even arrangement of which indicates that they were carried into the drain by water, through the drain hole and so before the limestone cover slabs were robbed from the northern half of the ring drain.

While the ash in the baths fell on a structure that had been recently refurbished and was apparently still functioning in AD 472, at the theatre the story is different. The identification in 2006-2009 of primary volcanic layers behind the proscenium indicates that the stage building was in a ruinous state by AD 472. This is confirmed by the column shafts and other architectural membra found here, which probably come from the *scaenae frons*; the imperial statue could conceivably also come from this façade. The extent of spoliation of the marble of the orchestra and the seating of the *cavea* prior to AD 472 is unclear. The absence of volcanic layers across the orchestra suggests that the marble of this surface was stripped later, after AD 472. The ring drain also seems to have still functioned in AD 472, though it was soon filled up with clay and ash. At the exterior edge of the *cavea*, the later spoliation trenches, which cut through the

¹¹⁷ This volcanic deposit, like all others on site, was examined in person and analysed by Prof. Claudio Scarpati in the Dipartimento di Scienze della Terra, dell'Ambiente e delle Risorse at the Università degli Studi Di Napoli Federico II.

primary volcanic layers described above, follow the line of what was probably a set of external steps up to the vaulted substructures of the *cavea* as well as some of the structural walls of the building. Of the three bays of the substructures exposed, the northern one, Room A, has been destroyed by this later activity. However, Rooms B and C preserve key evidence of the use of this sector of the theatre in late antiquity. Both contained preserved occupation deposits consisting of compact reddish-brown clay with significant concentrations of charcoal and traces of burning, as well as numerous ceramic fragments lying on their surfaces. In Room C this deposit was covered by the primary volcanic deposit and was not excavated but in Room B it was cross-sectioned and excavated. It produced large quantities of bone, glass, and ceramics. The pottery from the surface of the deposit and from within it includes a range of ARS, notably Hayes 61B, 74 and 84, dating to the second half of the 5th c. and local cooking wares dated to the late 5th c. (Fig. 4 no. 9-12).¹¹⁸ Although no volcanic deposits were found inside Room B, the upper surface of this occupation deposit is lower than the volcanic layers outside the theatre; presumably Room B was closed off when the eruption struck, unlike Room C. A massive concentration of charcoal at the eastern end of Room B suggests that some form of wooden structure, perhaps a frame or a roof was built into this part of the structure and then burnt down. The theatre at Aeclanum, therefore, had gone out of use well before the AD 472 eruption, probably after the mid-4th c. earthquake. By 472, the stage building had been dismantled and at least some of the vaulted bays of the substructures of the *cavea* were being lived in.

How does the evidence from the baths and theatre fit with the picture from elsewhere in the city? There is no doubt that the 4th-5th c. were a period of flux at Aeclanum. A large-scale campaign of urban renovation at the site seems to have taken place in the 4th c., probably after the AD 346 earthquake.¹¹⁹ Local notables played a role in this process: an inscribed statue base dating to the 4th c. honours the senatorial *fabricator* Umbonius Mannachius, for his contributions to the city, which added ‘both to utility and embellishment’; it was set up by the *ordo* of the city.¹²⁰ The restoration of the baths belongs to this phase of work and the substantial Christian basilica was constructed in either the late 4th or, more likely, the 5th c..¹²¹ Indeed it was in the early 5th c. that Julian (‘of Aeclanum’) was bishop in the city and it is tempting to think that at this stage more than any other the city enjoyed a position of genuine inter-regional importance. This new church was partly built over an earlier, 2nd c. AD, terraced house and at its eastern end it extended over a major crossroads, effectively severing a key part of the road system and so creating a new ecclesiastical quarter in the city centre. The walls of the church, and especially its 6th c. refurbishments, made use of large quantities of spoliated material.¹²² Many of the walls of the large Imperial-period houses excavated in the centre of the city in the 1950s and 1960s were also rebuilt and adjusted in this period.¹²³

This process of urban renewal was uneven, however. Industrial facilities also began to develop in this previously residential area in late antiquity, though good dating evidence for this intrusion is lacking. Among these facilities is a glass workshop, installed in the peristyle of the large *domus* north-east of the basilica, a series of basins found to the north of the same house, and a large kiln just to the east; various wells also belong to this phase.¹²⁴ Colucci Pescatori and Di Giovanni date some of the glass from the peristyle house to the 3rd-4th c. but

¹¹⁸ On the ARS (Fig. 4, no. 10-12), Bonifay 2004, pp.164-165, fig. 89, 167-168, fig. 90, type 38. The cooking pot in Fig. 4, no. 9, is type Turchiano 17.6 (Turchiano 2000, 265, pl. X, no. 17.6).

¹¹⁹ Tocco Sciarelli 1999, 250; Lo Pilato 2010, 352.

¹²⁰ *CIL* IX 1128 = *ILS* 5506; Caruso 2005.

¹²¹ Di Giovanni 1996, 241-250; Lo Pilato 2010, 353-356; Colucci Pescatori 2017, 172-174.

¹²² Lo Pilato 2010, 351-352 fig. 7; Tocco Sciarelli 2006, 691-692.

¹²³ Colucci Pescatori and Di Giovanni 1999, 32-33; Lo Pilato 2010, 351-352; 2013, 64-65.

¹²⁴ Onorato 1960, 28; Lombardo 1977, 815-816; Lo Pilato 2010, 351.

it would make sense for much of this activity to post-date the earthquake.¹²⁵ As the theatre shows, some major public buildings were derelict by the late 4th c. and were being spoliated and/or lived in. One structure, a house or shop, that was never rebuilt after the earthquake was excavated in 2017, just east of the main residential sector. It had collapsed suddenly – one wall, with window in it, falling flat with the roof collapsing on top – and was then neither rebuilt nor removed.¹²⁶ The solidly-built public buildings received more attention and indeed a parallel for the situation in the theatre is provided by the *macellum*. The mid-20th c. excavations here showed that this structure was at least partly occupied by dwellings by late antiquity.¹²⁷ New excavations here in 2017 confirmed this and the ceramics recovered clearly date this occupation to the 5th c.. Among the material recovered was a wide range of imported ARS forms, most dated to before the eruption (Hayes 61 (A-C), dated to AD 390-450, and Hayes 74 (C), dated to AD 450-475). Local cooking wares from the excavations also support a 4th to 5th c. date (Fig. 4 no. 7-8).¹²⁸ Whether the structure ceased to function as a *macellum* in the 4th or 5th c. is not clear as of yet but again it is possible that the 346 earthquake acted as stimulus for the change in use; at Aesernia the *macellum* was repaired after the earthquake by Autonius Iustinianus, with certain materials paid for by state funds, but at Aeclanum it appears not to have been a priority.¹²⁹ Immediately to the west of the *macellum*, the forum seems to have abandoned and at least partially spoliated in the 4th-5th c.; post-holes relating to a dwelling were discovered in this area in the 20th c. excavations.¹³⁰

The aftermath of the eruption

Much of the discussion thus far has focused on the urban and rural landscapes covered by the eruption of AD 472. The actual impact of the eruption is harder to assess and certainly varied substantially across the region.

On the slopes of Somma-Vesuvius the eruption of AD 472 was devastating, as the volcanic deposits, especially those caused by lahars, at Pollena and Somma show. Recovery at these sites is limited. Above the AD 472 levels, especially at the site in Pollena Trocchia, the build-up of a thin palaeosoil was identified.¹³¹ It was the result of a few vegetative cycles and the development of grassland, to judge from the landsnails found. During this phase, newcomers did inhabit the upper floor of the villa with baths, set a small oven directly above the lahar deposits, and proceeded with a thorough spoliation of the brick facing of the still-standing walls; they also emptied the volcanic debris from the cistern and used some of this same volcanic material to replaster it. Shortly after, however, a new eruption buried the site in its entirety with ashes, probably in AD 512.

On the Nola and Sarno plains, the eruption appears not to have caused significant direct damage to structures. The primary volcanic deposits mostly covered or filled ruined buildings. At Cimitile, where a number of skeletons were found in the basilica, the falling lapilli might have caused the roof to collapse, though the walls of the building were not affected.¹³² Secondary events, however, caused more damage, especially lahars. At Nola, a syn-eruptive

¹²⁵ Colucci Pescatori and Di Giovanni 1999, 32-33.

¹²⁶ De Simone and Russell 2018, 300.

¹²⁷ Onorato 1960, 28; Lombardo 1977, 814; Tocco Sciarelli 1999, 251.

¹²⁸ Fig. 4, no. 7-8, are cooking pots with red coated surfaces similar to Leone 7 (Leone 2000, 418, pl. XIII, type 7), which date from the end of 4th and 5th AD.

¹²⁹ On Aesernia, *CIL* IX 2638 = *ILS* 5588; Ward-Perkins 1984, 20, 26.

¹³⁰ Tocco Sciarelli 1999.

¹³¹ De Simone, Perrotta, Scarpata 2011.

¹³² Lehmann 1993; Pagano 1997, 71.

debris flow filled part of the amphitheatre, burying it with up to 6 m of mud, and in the Torricelle necropolis walls were pushed sideways by debris flows, either during or soon after the eruption.¹³³ Floods of both volcanic and alluvial material certainly struck Cimitile in the early 6th century, either as a consequence of ash built-up in the wake of AD 472 or perhaps in connection with the early 6th c. eruptions discussed above.¹³⁴ At Marigliano, west of Nola, recently ploughed fields were swamped by lahars, which would have totally altered the agricultural landscape.¹³⁵ Despite this, the substantial building projects at the major ecclesiastical complex at Cimitile point to what Ebanista calls ‘l’indubbia vitalità del santuario’ through the 5th century, notwithstanding the incursions of the Visigoths, Vandals, and then the ash of AD 472; a new basilica was added in the 6th-7th c. AD.¹³⁶ Beyond Cimitile, evidence for post-AD 472 continuity of settlement around Nola is more limited. At the Via Saccaccio villa walls were built above the volcanic layers, probably in the 6th c. AD, but they follow a slightly different alignment and are of poor quality; limited ceramic evidence and a bronze coin of either Justin or Justinian suggest that this 6th c. phase of habitation was short-lived.¹³⁷

In the villa at Monte Donico, as well as at Abellinum, there is evidence for continued habitation. The parts of the villa occupied prior to AD 472 were not abandoned and the ceramics from the later occupation layers include local and imported African lamps datable to the 5th to 7th c. AD.¹³⁸ At Abellinum, new walls were built in the large *domus* immediately after the eruption and the occupation levels associated with them produced pottery datable to the 4th to 6th c. and coins, the latest dating to the reign of the Ostrogothic king Vitiges in AD 536-540;¹³⁹ this date has been used to suggest the structures were only finally abandoned during the Gothic War.¹⁴⁰ Activity in the necropoleis of Abellinum also continued after the eruption.¹⁴¹ Excavations on Contrada Quattrograne and Contrada Spagnola found new tombs cut into the ash layers of AD 472.¹⁴² The basilica of S. Ippolito at Capo la Torre continued in use for a long time after the eruption, the inscriptions on the tombstones dating up to AD 558.¹⁴³ Here, as at Nola, a shift in emphasis from old Roman city centre to new Christian suburban centre is apparent.¹⁴⁴

At Aeclanum, the relatively small quantities of ash that fell in AD 472 had no major impact on the status of the city; we do not see an abandonment of the urban centre here. The new basilica, echoing what has been observed at Nola and Abellinum but here in a city-centre location, was expanded and adorned with new mosaics, apparently in the 6th c. AD.¹⁴⁵ Testimony to the continued importance of the city as a population centre is provided by the large necropolis, in the San Michele locality, which was used well into the 6th c. AD.¹⁴⁶ In the *macellum*, the ceramics from the new excavations suggests that the dwellings here continued after AD 472. In the baths, however, the only evidence for human activity immediately after

¹³³ Mastrolorenzo *et al.* 2002, 32, fig. 6f, fig. 6i; Di Vito *et al.* 2017, 139.

¹³⁴ Lehmann 1993, 127; Albore Livadie *et al.* 1998, 73; Ebanista 2003, 23; Di Vito *et al.* 2017, 139.

¹³⁵ Di Vito *et al.* 2017, 139, fig. 7b.

¹³⁶ Ebanista 2003, 23-24.

¹³⁷ Sampaolo 1986, 114 n. 9; Lubrano *et al.* 2011-12, 226.

¹³⁸ Festini and Procaro 1998, 73 n. 14.

¹³⁹ Colucci Pescatori 1986, 129-132.

¹⁴⁰ Tocco Sciarelli 1999, 249.

¹⁴¹ Colucci Pescatori 1986, 124.

¹⁴² Fariello and Lambert 2009, 53-54.

¹⁴³ Fariello Sarno 1991; Fariello and Lambert 2009, 55-56, 63; Colucci Pescatori 2005, 298-306; 2013; 2017, 169-170.

¹⁴⁴ Fariello Sarno 1996, 161; on this comparison, see also Ebanista 2003, 567.

¹⁴⁵ Di Giovanni 1996, 241-250; Lo Pilato 2010, 353-356; 2013, 65-68; Colucci Pescatori 2005, 291; 2017, 172-174.

¹⁴⁶ Lo Pilato 2005; 2010, 536-358.

the eruption is provided by the stripping of paving and the digging out of pipes embedded in the mortar beneath the floors (see Fig. 11, 12). There is no evidence that the baths were ever used as baths again. A number of burials were inserted into the structure in the centuries that followed and then large-scale spoliation of the walls and flooring began, probably in the Medieval period. The eruption also ushered in a new phase of more intensive spoliation in the theatre, which was eventually demolished down to ground level across most of its extent, effectively becoming a quarry for the early Medieval city.

Conclusions

From a volcanological perspective, the finds from Aeclanum allow existing models of the ‘Pollena eruption’ to be tested and modified. The primary volcanic layers from the baths and the theatre, though limited in area, show that between 10 and 29 cm of tephra fell on Aeclanum; and since the deposits in the theatre are eroded, the total could have been even greater than 29 cm. These deposits comprise lapilli and ash, much like those found at Abellinum. Further data supporting the observations made in Aeclanum come from rescue excavations 2 km east of the city, half way between it and the modern town of Grottaminarda. These excavations exposed an agricultural landscape, including vineyards, as well as a number of tombs.¹⁴⁷ Volcanic layers associated the ‘Pollena eruption’ were exposed in multiple sections here and their depth recorded as 20–30 cm. Compared to the volcanic deposits discussed above from the northern slopes of Vesuvius and the Sarno and Nola plains, the ash layer at Aeclanum and its vicinity is relatively uniform and thin. However, considering that this site is 55 km from Vesuvius, 30 cm is a not insignificant depth of ash. The finds at Aeclanum show that while the direction of the tephra fallout proposed by Rosi and Santacroce is broadly correct (see Fig. 1), the depth of ash at this distance from the volcano were more substantial than previously thought; the impact of the eruption was directly felt, as a result, by a wider area of inland Campania and northern Apulia than has previously been assumed.

From an archaeological perspective, the AD 472 volcanic deposits at these various sites provide a clearly identifiable *terminus ante quem* in the stratigraphic record. The state of the structures and landscapes covered by these ashes, therefore, offers a snapshot of living conditions across Campania and northern Apulia in the 5th c.. For Mastrolorenzo *et al.* this was a region ‘in a phase of deep decline’ and there is certainly supporting evidence to indicate real difficulties, as outlined above.¹⁴⁸ According to more positive narratives, which follow Vera’s model of a distinctive ‘sistema agrario tardoantico’, this was a period in which the entire Italian peninsula was shifting towards a new economic system, whose main features can be summarised as a general rearrangement of settlements – with the creation of *vici*, a more diversified agricultural production, and the abandonment of marginal lands – as well as new business models based on *latifundia*.¹⁴⁹ This model has been widely used for Apulia and, partially, for Campania.¹⁵⁰ However, the evidence discussed above shows a patchwork of situations, which do not seem to follow a single trend but rather can be explained through a mixture of factors or ‘pulling forces’.

De-urbanisation and apparent impoverishment affected individual cities across this region differently according to their hierarchy and location (proximity to routes or nodes, proximity to the coast). The pattern of abandonment or re-appropriation of public buildings and spaces, as well as of ruralisation, varies substantially between sites in different areas: at

¹⁴⁷ Unpublished reports by A. Palermo Rossetti and R. Esposito now in the archive of the *Soprintendenza archeologia, belle arti e paesaggio per le provincie di Salerno ed Avellino* in Avellino.

¹⁴⁸ Mastrolorenzo *et al.* 2002, 32.

¹⁴⁹ Vera 1995.

¹⁵⁰ Volpe 1996; Savino 2005.

Nola and Abellinum, for example, there is much more evidence for continued habitation and the addition of new burials at the latter compared to the former, even if both sites had lost most of their Roman public buildings by AD 472. In the countryside, the larger villas shrink but develop new productive areas, while the smaller ones are either abandoned or show, through spoliation and the evidence provided by ecofacts, reliance on a subsistence-based economy. Against this wider background, churches become the new centres of activity, either by taking prominent places within the cities or developing new areas out of the city walls. At Nola and Abellinum a shift from urban to suburban monumentalization, especially with regard to ecclesiastical complexes, is clear.¹⁵¹ In the case of Cimitile, Giuntella refers to it as ‘una vera e propria città-santuario’, which became the effective successor of Nola.¹⁵² For Fariello Sarno, talking about the relationship between Abellinum and Capo la Torre, these suburban complexes represented the new, in contrast to the decaying urban cores of the cities.¹⁵³

The new excavations at Aeclanum add further nuance to this picture. At this site, at least, developments between the 4th and 5th c. are extremely varied: new structures were added to the existing urban plan, others dismantled, and still more reconfigured or simply abandoned.¹⁵⁴ Many of the largest Roman public buildings and spaces had been subdivided into residential property by AD 472 but the baths were still functioning, and had been recently restored and even enlarged. The forum was no longer the focus of civic life and instead the church seems to have assumed a greater role, reflecting patterns found throughout Italy.¹⁵⁵ However, at Aeclanum, intriguingly, the new ecclesiastical centre developed right in the heart of the old urban centre. The blocking of roads and the reconfiguration of existing properties around the church has led Lo Pilato to talk of a new *insula episcopalis*.¹⁵⁶ If this new ecclesiastical centre represented the ‘new’, as Fariello Sarno and others have proposed, then at Aeclanum this ‘new’ developed right in the heart of the ‘old’.

A final point should be made on the apparent differences between cities and other sites in the plains around Vesuvius and those in the Apennines, which the ashes of AD 472 help to reveal. The sites of the interior appear to have weathered the turbulence of the 4th and 5th c. better than their more coastal contemporaries. This might be a result of the fact that they were already more self-sufficient economically and so were better able to adapt to a new economic system more dependent on localised agriculture than previously. But we should not overlook the very substantial impact that the Visigothic and Vandal assaults seem to have had on the coastal plain. The cities of the interior were more insulated from these events. While they suffered during the major earthquake of AD 346, the epigraphy and archaeology suggests recovery afterwards; at Aeclanum this event was a stimulus for increased urban investment and a reconfiguration of the old city centre. Disturbances comparable to those experienced by the coastal zones in the early and mid 5th c. only manifested themselves in Hirpinia in the 7th c., during the wars between the Lombards and the Byzantines, at which point Aeclanum at least drifts out of the historical record.

¹⁵¹ Ebanista 2003, 563-4.

¹⁵² Giuntella 1998, 62, 67.

¹⁵³ Fariello Sarno 1996, 161; on the same point, Christie 2006, 206; Rotili 2017, 727-728.

¹⁵⁴ On this point, Colucci Pescatori 2005, 288-289.

¹⁵⁵ On the abandonment of fora, though not a universal development, see Christie 2006, 214-217.

¹⁵⁶ Lo Pilato 2010, 352.